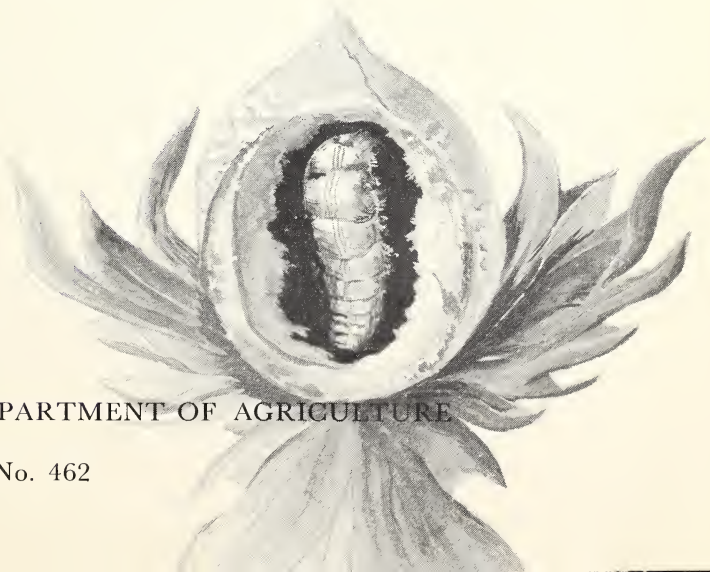
the BOLLWORM

how to control it



U.S. DEPARTMENT OF AGRICULTURE

Leaflet No. 462

the BOLLWORM
how to control it

The bollworm [1] feeds on cotton squares and bolls; it reduces yield and sometimes destroys the crop. It does more damage to cotton than any other insect except the boll weevil, and costs American cottongrowers millions of dollars every year.

This pest occurs throughout the Cotton Belt. Usually, it does most damage in Texas, New Mexico, Arizona, California, Oklahoma, Arkansas, Mississippi, and Louisiana.

The bollworm feeds also on corn, tomatoes, grain sorghums, peas, alfalfa, lespedeza, beans, soybeans, flax, peanuts, and many other plants. On corn, it is called the corn earworm; on tomatoes, the tomato fruitworm.

DEVELOPMENT

In its development, the bollworm has four stages: Egg, larva (caterpillar), pupa, and adult (moth). Only the larvae are destructive.

Between spring and early fall, this insect produces 4 to 6 generations. The last generation remains in the pupal stage and passes the winter in the soil.

For about a month in spring, moths emerge from overwintered pupae. Moths are yellowish or brownish; they have a wingspread of 1 to 1½ inches.

Female moths of the season's first generation lay eggs on clover, alfalfa, bluebonnets, winter peas, young corn, and other plants. Second-generation moths lay eggs on silks of young ears of corn, if they are available. If corn silks are not available, the second-generation moths lay eggs on other plants—on cotton in some areas. Third and later generations of moths (which often overlap) lay eggs on cotton.

On cotton, moths usually lay eggs on the tender, growing tips of plants and on the top sides of leaves. Sometimes they lay eggs on squares, bolls, and stems.

Eggs are white, ribbed, and dome shaped; they are about half the size of a pinhead. Larvae hatch from the eggs in 3 to 5 days.

Color of the larvae varies; it may be pale green, rose, brown, or almost black. Full-grown larvae are 1 to 1½ inches long.

For a day or two after hatching, larvae feed on the nearest tender growth. Then, larvae on terminal buds of the cotton plant move downward; those on fruiting branches move toward the center of the plant. The larvae eat out the squares, and

[1] *Heliothis zea.*

tunnel into and eat the contents of the bolls.

Mature larvae enter the ground and change into mahogany-brown pupae, from which moths emerge.

CONTROL

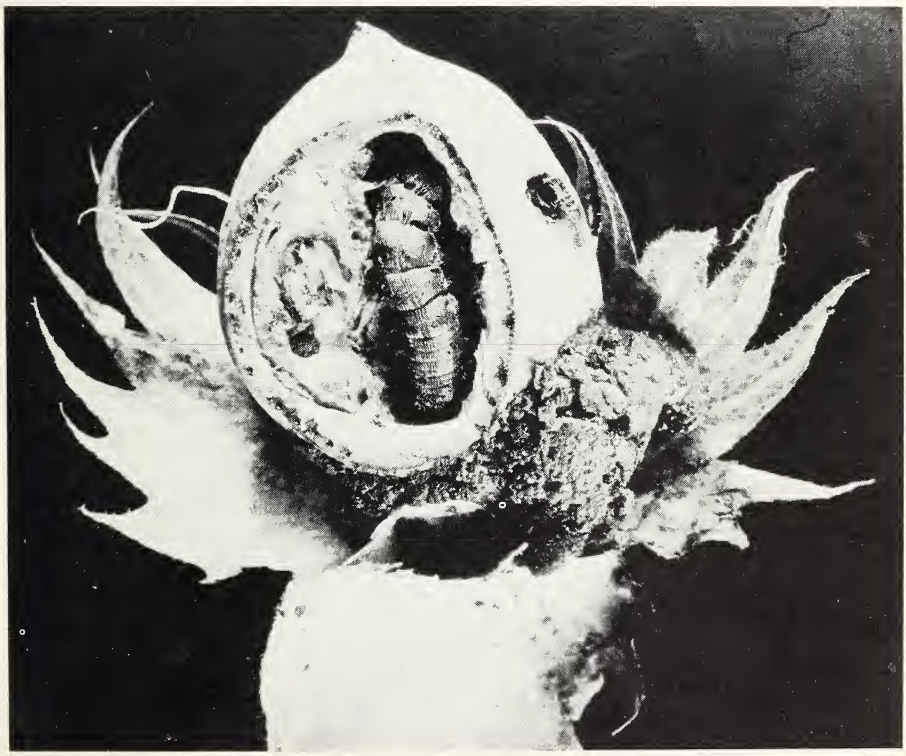
The use of an insecticide to control the bollworm is not always necessary. The bollworm has natural enemies such as flower bugs, aphislions, and several species of lady beetles. Sometimes these insects eat bollworm eggs and larvae, and keep damaging infestations from developing. Insecticides may kill the bollworm's insect enemies, and thus indirectly cause heavy bollworm infestations to develop.

Do not depend on other insects to control the bollworm, however. Inspect your field regularly to determine whether an insecticide is needed.

Inspecting Fields

Bollworms begin to lay eggs on cotton about the time the plants begin to square. In areas where corn is grown, this is also about the time corn silks begin to dry. Start to inspect cottonfields at this time. Repeat inspections every 5 to 7 days.

To inspect a cottonfield of 5 acres or less, walk across it diagonally.



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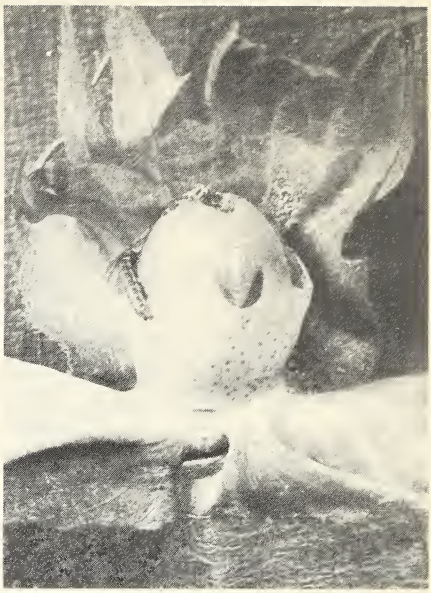
Cotton boll with part cut away to show full-grown bollworm at work.

Examine 100 main-stem terminals (the top 3 or 4 inches of the plants); on some plants, examine the squares and bolls also; look for eggs and larvae.

If the field is larger than 5 acres, make similar examinations in different sections.

Treatment is needed if both eggs and larvae are present. Apply insecticide if you find any eggs *and* as many as 4 small larvae per 100 terminals; or if on examining 100 small squares you find that as many as 5 of them have been injured by small larvae.

Start treatment when larvae are small; large larvae are difficult to kill.



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Newly hatched bollworm feeding on outside of young boll.

Using Insecticide

When an inspection shows insecticide is needed, apply it every 5 days. Stop applications when you no longer find eggs or when the crop matures.

Selection

You may need to control only the bollworm, or the bollworm plus other cotton insects.

Bollworm alone.—To control the bollworm when no other cotton pests are present, apply one of the following:

- DDT, 0.5 to 2.0 pounds per acre in a dust or spray.
- Endrin, 0.2 to 0.5 pound per acre in a dust or spray.
- DDT, 1.0 to 1.5 pounds per acre, plus toxaphene, 2.0 to 3.0 pounds per acre, in a spray.
- Sevin, 1.0 to 2.0 pounds per acre in a dust.

Use the higher dosages where infestions are heavy.

Consult your county agricultural agent to determine which insecticides and dosages are best in your locality.

Bollworm plus boll weevil.—To control both the bollworm and the boll weevil, mix DDT with any of the insecticides recommended for control of the boll weevil with the exception of endrin or Sevin. You can use endrin or Sevin without addition of DDT.

Bollworm plus cotton aphid.—When endrin or Sevin is used to control the bollworm, aphid buildup seldom occurs. However, the cotton aphid often increases after repeated applications of DDT or combinations of DDT and other chlorinated hydrocarbon insecticides used for boll weevil control.

If you need to control aphids as well as bollworms, add parathion or

demeton to DDT, or to the mixtures being applied for bollworm or bollworm-boll weevil control.

Bollworm plus spider mites.—Spider mites may be present before you apply insecticide to control the bollworm; or they may develop later.

To kill spider mites, add one of the recommended miticides such as parathion, demeton, Aramite, ethion, or Trithion to the insecticide you are using for bollworm control. A dust formulation of one of the recommended insecticides, containing at least 40 percent of sulfur, usually prevents damaging infestations of spider mites.

Application

Spraying.—To avoid runoff, apply sprays when leaves are dry.

When spraying with a ground machine, use three cone-type nozzles; set one nozzle 6 to 9 inches above the plants; set other nozzles one at each side of the row, with spray directed toward plants. In rank cotton, nozzles may be spaced 20 inches apart on the boom.

For safety, mount boom at rear of tractor. Apply spray at a pressure conforming with local recommendations—usually about 60 pounds per square inch.

If you spray by airplane, flag the flights; make swaths overlap; use nozzles or atomizing devices that produce droplets of 100 to 300 microns. Do not spray by airplane when wind velocity exceeds 8 miles an hour.

Dusting.—Do not apply dust when wind velocity exceeds 4 miles an hour.

When applying dust with a ground machine, set the duster nozzle 4 to 6 inches above the plants.

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Cotton boll damaged by the bollworm.

If you dust by airplane, flag the flights and make swaths overlap.

PRECAUTIONS

- **Most insecticides are poisonous; heed precautions on container labels.**
- Store insecticides where children, pets, or livestock cannot reach them.
- Do not inhale sprays or dusts; do not get them on your skin.
- If you spill insecticide on your skin or clothing, bathe immediately and change clothing.
- If you accidentally swallow an insecticide, induce vomiting by taking 1 tablespoonful of salt in a glass of warm water; repeat if necessary; call a doctor.
- Protect food and feed crops from the drift of insecticides being applied for bollworm control.
- To minimize losses of honey bees and other pollinating insects, make insecticide applications, if possible, during hours when bees are not visit-

ing the plants. Avoid drift into bee yards and adjacent crops in bloom. Notify beekeepers at least 48 hours before dusting or spraying, so that measures can be taken to protect the bees.

- To protect fish and wildlife, be careful not to contaminate streams, lakes, or ponds with insecticides. Do not clean spraying equipment, or empty excess spray material, near such water.

Prepared by

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